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EXAMINER

AMARI, ALESSANDRO V

ART UNIT PAPER NUMBER

2872

DATE MAILED: 09/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/863,002

Applicant(s)

KLEEMANN ET AL.

Examiner

Alessandro V. Amari

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☒ Interview Summary (PTO-413) Paper No(s). 15.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11 July 2003 has been entered.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 3-6, 10-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Staunton U.S. Patent 3,045,532.

In regard to claim 1, Staunton discloses (see Figure 2) a grating with a multiplicity of parallel diffraction, structures succeeding one another periodically (1, 1', 1''), which are arranged on a support defining a base area and each incorporate a planar blaze flank (1-2) inclined towards the base area substantially at an angle (inherently, there is an angle of incident light which will satisfy the Littrow condition for the grating) and a counterflank (2,3), wherein the blaze flank and the counter-flank form at the apex of a diffraction structure an apex angle which is less than 90° as can be seen at the top of

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the element 1', characterised in that the counter-flank comprises at least two substantially plane area sections (2-3, 3-1') as described in column 3, lines 12-14 which, bordering one another and inclined relative to one another by an angle of inclination extend parallel with the extension direction of the diffraction structure as shown in Figure 2, wherein due to the inclination of the at least two area sections relative to one another the counter-flank all in all exhibits a concave surface viewed from the light incidence side as described in column 3, lines 12-14, and in that region of the counter flank where the two substantially plane area sections meet, is lower than the lowest area of the blaze flank as shown in Figure 2 where the element 3' is lower than 2'. Staunton does not explicitly label his device Littrow. However, as illustrated above, the reference teaches all of the structure required by the claim in support of such a label. Thus, the structure of the reference must inherently support the label in the same manner as the structure of the claim.

Regarding claim 3, Staunton discloses that that the angle of inclination (β) lies in the range from 90° to 150° as can shown (see angle between 2-3, 3-1') in Figure 2.

Regarding claim 4, Staunton discloses that the grating consists of quartz glass as described in column 4, lines 67-69.

Regarding claims 5 and 6, Staunton discloses that the grating comprises a coating increasing the reflectivity in that the coating is an aluminum coating as described in column 2, lines 54-56.

Regarding claim 10, Staunton discloses that that the blaze flank comprises, measured normal to the extension direction of the diffraction structures, a minimum

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width of $g \cos(\theta)$, where g designates the grating period of the grating and θ the Littrow angle. Inherently, there will be some grating period and angle, which satisfies the Littrow condition and the minimum width limitation for the blaze flank.

Regarding claim 11, Staunton discloses the use of a grating in a diffraction order of the incident light wavelength above or equal to the 15th diffraction order. Inherently, one can have an incident light wavelength above or equal to the 15th diffraction order, which satisfies this limitation.

Regarding claim 12, Staunton discloses the use of a grating for the diffraction of UV light with a wavelength that is less than 250 nm as described in column 1, lines 42-44 and column 2, lines 9-12.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Staunton U.S. Patent 3,045,532.

Regarding claim 2, Staunton teaches the claimed invention except that the area sections exhibit a width ratio of 0.5 to 2 measured normal to the extension direction of the diffraction structures. It would have been obvious to one having ordinary skill in the art at the time the invention was made to manufacture the grating such that the area sections exhibit a width ratio claimed, since it has been held that where general

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conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

6. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Staunton U.S. Patent 3,045,532 in view of Tomono U.S. Patent 5,629,804.

Regarding claims 7 and 8, Staunton teaches the invention as set forth above but does not teach a dielectric layer system, which comprises layers of Al_2O_3 and MgF_2 . Tomono teaches a dielectric layer system which comprises layers of Al_2O_3 and MgF_2 as described in column 5, lines 66-67 and column 6, lines 1-2. It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the dielectric layer system as taught by Tomono in the grating of Staunton in order to improve the transmissivity of the grating.

7. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Staunton U.S. Patent 3,045,532 in view of Tomono U.S. Patent 5,629,804 and further in view of Urino U.S. Patent 4,991,937.

Regarding claim 9, the combination teaches the invention as set forth above but does not teach that the dielectric layer system comprises layers of LaF_3 and MgF_2 . Urino teaches the dielectric layer system comprises layers of LaF_3 and MgF_2 as described in column 3, lines 1-10. It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the dielectric layer system as taught by Urino in the combination in order to improve the transmissivity of the grating.

Response to Arguments

8. Applicant's arguments filed 11 July 2003 have been fully considered but they are not persuasive.

The Applicant acknowledges that in a diffraction grating placed in a Littrow condition that the incident angle of light is equal to the angle of diffraction of a certain diffraction order times the wavelength. However, the Applicant argues that the Littrow configuration additionally requires that the blaze angle of the diffraction grating be equal to the angle of incidence and the angle of diffraction. In support of this position, the Applicant cites PCT publication No. WO 00/16134 which states that in a Littrow condition the blaze angle of the diffraction grating is equal to the angle of incidence and the angle of diffraction.

In response to this argument, the Examiner would like to point out that all that is required of a grating operating in a Littrow condition is that it meet the simplified grating equation (i.e., $2d \sin(\alpha) = m\lambda$) and thus the blaze angle does not necessarily have to be equal to the angle of incidence and diffraction. The '16134 reference cited by the Applicant as supporting his contention that the blaze angle of the diffraction grating is equal to the angle of incidence and the angle of diffraction is in respect to an echelle grating geometry. In the particular case of the '16134 reference, since an echelle geometry operates close to the Littrow mode, the blaze angle of the diffraction grating is equal to the angle of incidence and the angle of diffraction. However, the claimed invention is not an echelle grating geometry so this contention does not hold.

The Applicant further argues that geometrical analysis (as shown in Figure 1 submitted in the latest response) of the Littrow condition shows that if we set the angle of incident light equivalent to the blaze angle, then the incident angle of light with respect to the blaze flank will always be equal to 90 degrees, in other words in a Littrow configuration, the impacting light is always perpendicular to the blaze flank.

In response to this argument, the Examiner would point out that in a Littrow configuration, the grating equation simplifies to $2d \sin(\alpha) = m\lambda$, wherein d is the period spacing, α is the angle of incidence (which is equal to the angle of diffraction), m is the diffractive order and λ is the wavelength. It does not require that the blaze angle be equal to the angle of incidence and angle of diffraction and that the incident light with respect to the blaze flank be 90 degrees. All that is required is that for 2 times a fixed period (d), and the sin of some angle of incidence (α), there will be some diffractive order (m) multiplied by some wavelength (λ) which will satisfy the Littrow condition.

The Applicant further argues that in the prior art Staunton, the incoming light cannot impact the 1-2 flank at a 90 degree angle as shown in the applicant's Figure 2 (submitted with the latest response) and if any light did in fact impact the 1-2 flank or the 2-3 flank at a 90 degree angle such as shown in Figure 3, it would always impact the corresponding flank (2-3 or 1-2 relatively). Therefore, the Staunton reference can never comprise a Littrow grating with a single blaze flank and a bi-planar counterflank in which the blaze flank is specifically recited as being "inclined toward the base area substantially at the Littrow angle...". Thus the inclination of the blaze flank shown as the angle θ in the original figures of the application is directly equivalent to the incident

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angle of light (α) and the diffracted angle of light (β) as is required under Littrow conditions.

In response to this argument, the Examiner would again like to reiterate that all that is required of a grating operating in a Littrow condition is that it meet the simplified grating equation: $2d \sin(\alpha) = m\lambda$. In regard to the applicant's submitted Figure 2, there is no physical reason provided why the incoming light could not impact the 1-2 flank at a 90 degree angle or if it did impact the 1-2 flank why it would always impact the corresponding flank nor why this would contradict the simplified grating equation under Littrow. The Applicant's assertion that under Littrow conditions, the inclination of the blaze flank is directly equivalent to the incident angle of light (α) and the diffracted angle of light (β) only applies to echelle gratings and not to the applicant's claimed grating as explained previously. Thus the Staunton reference can be read as a grating operating under Littrow condition, since all that is required of the Staunton grating is that it comprise a single blaze flank and a bi-planar counterflank in which the blaze is inclined toward the base area substantially at the Littrow angle as shown in Figure 2 of Staunton. Inherently, there will be some period spacing, incident angle, diffractive order and wavelength combination which will meet the Littrow condition and thus satisfy the limitation that the planar blaze flank be inclined toward the base area substantially at the Littrow angle. The Examiner would like to further note that the term "Littrow grating" is not one that is known to one having ordinary skill in the art. Typically, the terms used in the art are a grating in a "Littrow mount" or operating in a "Littrow condition".


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9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alessandro V. Amari whose telephone number is (703) 306-0533. The examiner can normally be reached on Monday-Friday 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on (703) 305-0024. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

ava *ava*
03 September 2003


MARK A. ROBINSON
PRIMARY EXAMINER